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Texas Astronomer Wins ASP's Muhlmann Award for Infrared Instruments

Astronomer John Lacy of The University of Texas at Austin has been given the 2004 Maria and Eric Muhlmann Award by the Astronomical Society of the Pacific. The award is given for "recent scientific observational results made possible by innovative advances in astronomical instrumentation, software or observational infrastructure." It will be presented at the Society's annual meeting in Berkeley, California on July 23.

Lacy has been building astronomical instruments that allow scientists to study infrared light from the heavens for more than three decades. The ASP Board of Directors said they "recognized the unique science" that can be done with Lacy's instruments.

"It's been a progression, a series of instruments that I've worked on," Lacy said. "I started when I was a grad student. They're all infrared spectrographs. Each one was better than the previous one."

A spectrograph is an astronomical instrument attached to a telescope. When a telescope collects light from an astronomical object like a star or galaxy, it feeds it into the spectrograph. The light is passed through a slit and is spread out into its component wavelengths -- as when light passes through a prism creating a rainbow. The resulting "spectrum" has features that can be studied in detail to reveal the star or galaxy's temperature, motions, chemical composition, and distance.

Lacy built his first infrared spectrograph as a graduate student, he says. "It didn't have a name - that was back before everything had an acronym." The instrument allowed him and fellow researchers to look at ionized gas at the heart of our Milky Way galaxy and provided what Lacy called "the first evidence of a massive black hole there." He added, "It turns out the mass that we calculated was exactly right." The work was done on the 100-inch telescope at Las Campanas Observatory in Chile.

Lacy's subsequent instruments include Irshell (rhymes with Herschel), TEXES, and EXES. Both Irshell (built 20 years ago, soon after Lacy came to The University of Texas) and TEXES were first used on the 2.7-meter Harlan J. Smith Telescope at McDonald Observatory in West Texas. Each was later shipped to Hawaii's Mauna Kea for use on NASA's InfraRed Telescope Facility (IRTF).

Lacy used IRSHELL to further study the black hole at the heart of the Milky Way. Its higher resolution allowed measurements of how gas is moving around the galaxy's center.

TEXES, the Texas Echelon Cross-Echelle Spectrograph, allowed measurements of molecules never before seen in space - including acetylene and methane, Lacy said. TEXES has also been used to study protoplanetary disks. Lacy said he hopes to use TEXES on the 8-meter Gemini North telescope soon to look at molecular hydrogen in a possible protoplanetary disk around the star T-Tauri.

Meanwhile, he's building EXES (a copy of TEXES) for SOFIA, NASA's Stratospheric Observatory for Infrared Astronomy. SOFIA is comprised of a 747 Boeing jet with a hole cut in its side where a telescope is mounted. It is the successor to NASA's B-9s Kuiper Airborne Observatory.

"I build instruments that I want to use," Lacy said, rather than so-called "facility instruments" designed to for easy use on a wide variety of observing projects. "I do make them available for other astronomers. I like that way of doing it because we can customize instruments for the exact kind of observing we want to do.

"It's cheaper than other methods," he added. "TEXES and EXES are both several times cheaper than similar kinds of instruments. We don't work with a particular team of engineers and software engineers, so you need one of us there to use our instruments.

"I learned this style of instrument building at Berkeley as a grad student from Charles Townes," Lacy said. "We were able to do things other people weren't doing, at low cost. It's not a style most people use; not everyone likes it. They would rather have facility instruments."

Of the 17 times the Muhlbmann Award has been given, John Lacy is the fifth recipient associated with The University of Texas at Austin astronomy program. Previous awardees include John Kormendy, Robert Tull, Edward Nather, and former UT graduate student Steven Vogt.